CONFIDENTIAL

April 9, 1952

Memorandum

To: Louis S. Gerdes, Executive Secretary, Defense Minerals Administration

From: Mr. Field Term, Region IV

Subject: MM Docket 364, Arnold L. Johnson Copper Prospect, Pinal County, Arizona

We are attaching an original and two copies of the report of our investigation of MM Docket 364.

We concur with the findings of the field man and recommend that the application be denied.

J. H. Earnest, Jr.

A. H. Koschmann

Attachments
One copy of report by air mail
Two copies of regular mail

Copies to: DMA files
Koschmann
Allsman
W. R. Storms
Chas. Anderson
Washington (3)

ARNOLD H. JOHNSON COPPER PROSPECT,
PINAL COUNTY, ARIZONA

Defense Minerals Administration Report
DMA Docket #366

APPROVED:

J. H. Earl, Jr.

A. H. Koschmann

United States Department of the Interior
Defense Minerals Administration
James Boyd, Administrator

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

REGIONAL DIRECTOR'S OFFICE
REGION IV
APR 2 - 1951
BUREAU OF MINES
DENVER, COLORADO

224 NEW CUSTOMHOUSE
DENVER 2, COLORADO

Mining Division
Region IV

April 2, 1951

Memorandum

To: DMA Field Team, Region IV

From: Chief, Mining Division

Subject: DMA Docket 366, Arnold H. Johnson's Copper Prospect, Pinal county, Arizona

Herewith is the above report on the above application. It is noted that the evidence of a field examination shows the deposit to be small, the mineralization erratic and the copper and precious metal content below an economic grade.

The report states, "the property does not warrant further development". I concur with this conclusion.

P. T. Allsman

Attachment
Original and 11 copies of report

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Arizona-New Mexico Branch
Mining Division
SOUTHWEST EXPERIMENT STATION
Box 4097
UNIVERSITY STATION
MAR 28 1951
BUREAU OF MINES
Denver, Colorado

MINING DIVISION
REGION IV

TUCSON, ARIZONA

March 27, 1951

Register, Return Rec. Req.

Memorandum

To : Paul T. Allsman, Denver, Colorado

From : Chief, Arizona-New Mexico Br., Mining Div., Region IV

Subject : DMA Docket 366, Arnold H. Johnson's Copper Prospect, Pinal County, Ariz.

Enclosed are original and 11 copies of the above report by Lloyd L. Farnham. Please return one copy to us and one to C. A. Anderson.

I believe Nels Peterson will send his report to Koschmann within a few days. Shride is sick with the flu and Anderson has been on the coast, so Peterson's report may be late.

Walter R. Storms

Walter R. Storms

CC P. T. Allsman
C. A. Anderson
DMA-366
DF

# ARNOLD K. JOHNSON'S COPPER PROJECT

## PINAL COUNTY, ARIZONA

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## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Lloyd L. Farnham[1] and N. P. Peterson[2]

The Arnold H. Johnson copper prospect is about 8 miles south of Ray, Ariz. in Pinal county. The property is held under a lode mining claim location by Arnold H. Johnson of 55 N. Matlock St., Mesa, Arizona. It was examined to determine whether or not the property warranted Governmental assistance under the Defense Production Act of 1950. The application for aid carries docket number DMA 366.

The known production from the property has consisted of some 36 tons of low-grade oxide copper ore shipped in the early part of 1950.

The deposit is opened by a small incline shaft, about 40 feet deep, near the bottom of which some 43 feet of drifting follows the vein. The mineral deposit consists of a narrow lenticular vein in which occur small lens or pods of oxide iron and copper minerals. Because of the lens-like nature of the copper-bearing bodies, with barren intervals between pinches, only about one-half of the vein is mineralized. The property contains no ore reserves nor does it appear likely that any worthwhile tonnage could be developed.

It is concluded that the prospect will not justify further exploration and hence is not worthy of aid from the Defense Minerals Administration.

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1/ Mining engineer, Bureau of Mines
2/ Geologist, U. S. Geological Survey

# Arnold H. Johnson Copper Prospect
# Pinal County, Arizona

By N. P. Peterson 1/

## Geology

1/ Geologist, U. S. Geological Survey, Globe, Arizona

## Geology

The area that includes the Arnold H. Johnson property is underlain by a pre-Cambrian granite which is a part of the extensive mass that forms the Tortilla Mountains. The granite is porphyritic and contains large phenocrysts of orthoclase in a coarse-grained groundmass of quartz, orthoclase, plagioclase, and biotite. It crumbles readily to weathering, and outcrops are generally mantled by a layer of decomposed rock comprised mainly of orthoclase and quartz grains. Around the borders of the mass it is overlapped by Tertiary Gila conglomerate which fills the valleys surrounding the Tortilla Mountains.

On the Arnold H. Johnson property the granite is cut by several fracture zones which strike from N. 80° E. to N. 65° W. and dip steeply southward. Narrow discontinuous dikes and small irregular masses of quartz diorite porphyry and a fine-grained andesitic rock have been intruded at numerous places along the fractures. Some shearing along the fractures occurred after the dikes were intruded. The major fracture zones are from 50 to 200 feet apart. The striations on the hanging wall of the only fracture zone explored by underground workings indicate horizontal displacement.

Slight mineralization can be recognized intermittently along the major fractures. In many places it is evident only because of dark greenish-gray coloration caused by chloritic alteration of the quartz diorite porphyry. Where both walls are granite, the fractures are difficult to recognize except in spots where the exposures are especially good. Along intervals in which the mineralization was most intense, the

gouge along the fractures contains abundant limonite, and the rocks are sericitized for a few feet adjacent to the fractures, but there is generally no evidence that sulfides were present in the altered rocks.

One of the most prominent fracture zones, which strikes N. 85° W. and dips about 70° south has been explored by a shaft 39 feet deep and two short drifts driven east and west from the shaft, 18 and 25 feet respectively. The main fracture zone as seen in the shaft and drifts is from 6 to 18 inches wide. The hanging wall is fairly well defined, and along it the limonitic gouge is said to have contained small masses of a gray sulfide, probably chalcocite, but none could be found at the time the property was visited. On the footwall side, the granite wall rock shows sericitic and probably some clay alteration for 5 or 6 feet from the fracture. The altered zone is sporadically mineralized with chrysocolla and copper carbonates that appear to have been formed from copper leached from primary minerals deposited along the main fracture. In the east drift the main fracture zone is very narrow and weakly mineralized, and very little oxidized copper minerals are visible in the adjacent rock. West of the shaft, the fracture zone contained lenticular masses of limonitic gouge from 4 to 18 inches wide, and more oxidized copper is visible. Thirty-five tons of rock containing 1.22 percent copper was shipped from this drift.

The outcrop of the vein fracture can be traced for several hundred feet. East of the shaft the mineralization appears to have been weak as in the vein exposed in the drift below. The appearance of the outcrop does not suggest that stronger or more continuous mineralization than that exposed in the workings is likely to be found.

The character of the primary mineralization is uncertain, but judging from the residual limonite it probably consisted of fine-grained pyrite and chalcopyrite deposited in the gouge along the fractures.

Several of the most prominent fractures in the area have been explored by shallow pits dug in places where oxidized copper minerals are present in the outcrops. The results are not encouraging. Two of the pits exposed mineralized fractures along basic dikes. One of these pits was dug across a short dike about 5 feet wide that forms the footwall of a rather insignificant, iron stained fracture zone. The dike rock exposed in the pit has been hydrothermally altered and contains a little oxidized copper minerals as thin films along joints and cracks.

Below the limit of oxidation, the major fractures probably contain discontinuous veins, a few inches wide, of fairly high grade sulfides. In general, the mineralization in this area is sporadic, and the volumes of rock affected are too limited in extent to constitute economic ore bodies.

# Arnold H. Johnson Copper Prospect
# Pinal County, Arizona

By Lloyd L. Farnham1/

Engineering Report

1/ Mining Engineer, Bureau of Mines

## INTRODUCTION

This report covers the results of the investigation of the copper prospect held by Arnold H. Johnson - DMA Docket 366. The examination was made as a result of a request by Johnson for Government aid under the Defense Production Act of 1950.

The application of Johnson states that the loan is requested essentially for the following purposes:

> To increase the production of copper ore by deepening the existing shaft from 35 feet to a depth of 200 feet.
>
> The total sum requested is $3,750, to be expended as follows:

| | |
|---|---|
| Buildings ..... | $750 |
| Machinery and supplies ..... | 1,000 |
| Labor ..... | 2,000 |
| | $3,750 |

Obviously this sum is grossly inadequate for the contemplated work. No doubt the cost of the equipment alone, such as would be necessary to perform the proposed development, would greatly exceed the amount requested by the applicant.

## LOCATION AND PHYSICAL FEATURES

The property known as the Black Copper group lies in the foothills of the Tortilla Mountains at an elevation of about 1,500 feet. Ray, Ariz., lies about 8 airline miles northwesterly from the property.

A siding and ore loading dock on the Florence-Winkelman Branch of the Southern Pacific Railroad is within one mile of the mine workings.

At a point some 3 miles south of Kelvin on the Kelvin-Florence County road, a fair road leads off in a southwesterly direction to the claims. The distance over this latter road between the county road and the mine is about 1 mile. The last quarter of a mile leading to the shaft is in bad condition and should not be attempted in a passenger car.

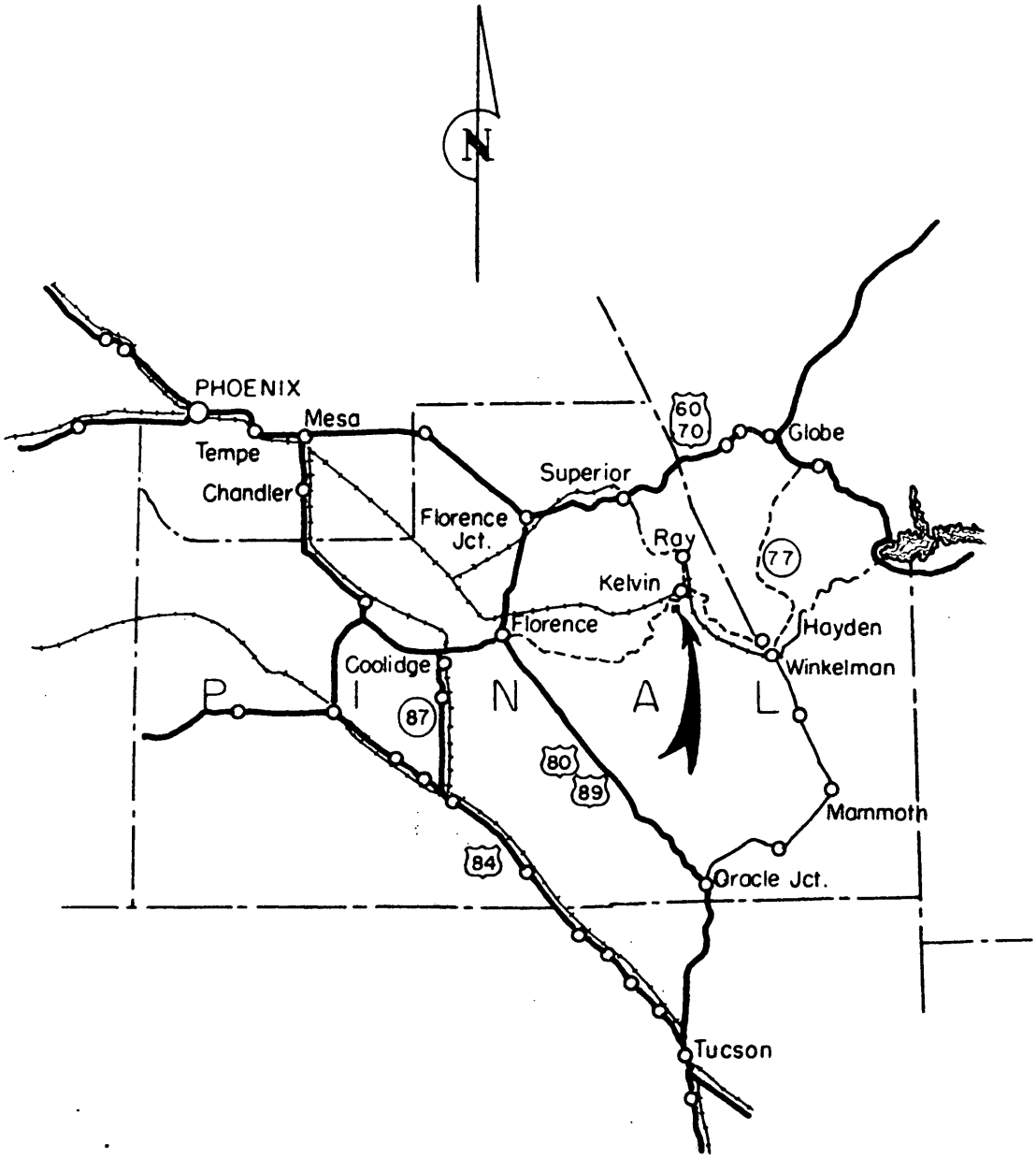
Rolling hills, covered with characteristic desert vegetation, typify the topography.

No water is available at the shaft site, but would no doubt be developed in the valley of the Gila River, less than a mile to the North.

PROPERTY AND OWNERSHIP

The Black Copper property consists of a contiguous group of five unpatented lode mining claims. According to the applicant they lie within Secs. 5 and 6, T. 4 S., R. 13 E., Gila and Salt River meridian and base line, Pinal County, Ariz. (fig. 1). The property is held under a mining location by the applicant, Arnold H. Johnson of Mesa, Ariz.

In the loan application Mr. Johnson mentions in addition to the Black Copper claims, another claim known as the Gray Copper which is located at some distance from the former group. Mr. Johnson informed the writer that he had no intention of spending any loan funds on the Gray Copper, hence it was not visited.




D. M. A. 366

0 5 10 20 30 40
MILES

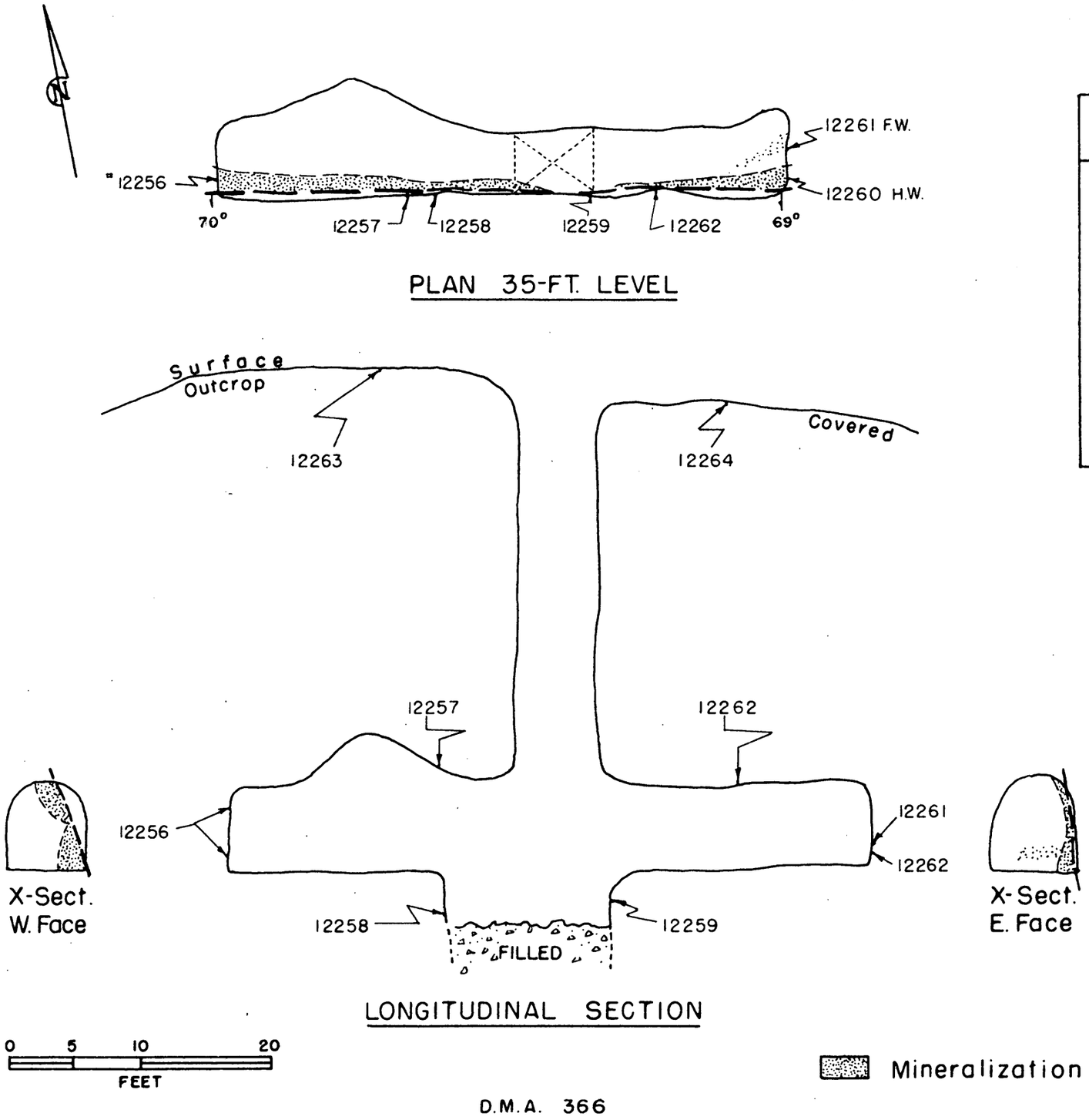
Fig. 1- Location map, Arnold H. Johnson Copper prospect, Pinal County, Arizona.

## HISTORY AND PRODUCTION

Prospecting and location work upon these claims dates back many years. The claims, no doubt, were abandoned and relocated many times. Judging from the few scattered prospect openings, very little if any production of copper ore was made prior to Arnold H. Johnson's location of the claims.

In January 1950, Mr. Johnson mined and shipped to the smelter at Hayden, Ariz. some 34 tons. The smelter settlement on this shipment gave the following metal contents: 0.008 ounces gold; 0.23 ounces silver per ton, and 1.22 percent copper. The smelter value of this material was $2.35 per ton. The market price of copper at the time was 18 cents per pound. The total smelting charges, exclusive of freight, amounted to $4.45 per ton. The shipper lost $2.10 per ton on the lot, not including the costs of mining and transportation. This material was taken out of the back of the west drift on the 35-foot level (fig. 2).

In March 1950, Mr. Johnson sold 1.19 tons of sorted ore to the Valley Assay Office of Tempe, Ariz. This lot had the following content: 0.02 ounces gold; 1.05 ounces silver and 5.7 percent copper. The total net to the shipper on this lot was equivalent to $7.23 per ton, not including costs of mining and transportation.




| SAMPLE NO. | WIDTH FT. | PERCENT | | |
|---|---|---|---|---|
| | | Au | Ag | Cu |
| 12256 | 2.0 | 0.005 | 0.4 | 0.76 |
| 12257 | 2.0 | Tr | 0.3 | 0.92 |
| 12258 | 2.1 | Tr | 0.2 | 0.68 |
| 12259 | 1.9 | Tr | 0.3 | 0.31 |
| 12260 | 1.5 | Tr | 0.3 | 0.39 |
| 12261 | 3.2 | 0.005 | 0.4 | 0.72 |
| 12262 | 0.5 | 0.005 | 0.5 | 4.85 |
| 12263 | 1.5 | Tr | 0.3 | 1.44 |
| 12264 | 1.5 | Tr | 0.3 | 1.18 |

Figure 2. - Assay plan and section, Arnold H. Johnson's Copper prospect, Pinal County, Ariz.

## GEOLOGY

The Arnold L. Johnson copper prospect is in an area underlain by a coarse-grained pre-Cambrian granite. The granite is cut by a number of fracture zones from 50 to 200 feet apart which strike from N. 15° E. to N. 65° W. and dip steeply southward. Narrow, discontinuous dikes and small irregular masses of quartz diorite porphyry have been intruded along some of the fracture zones.

Weak hydrothermal alteration and occasional copper stains in the outcrops show that some of the more prominent fracture zones have been mineralized. In the vein exposed in the underground workings the primary mineralization appears to have been confined to a few inches of gouge in the main fracture. A little chrysocolla and copper carbonates occur in the adjacent altered wall rock.

The copper mineralization in this area is sporadic, and the volumes of rock affected are too limited in extent to constitute economic ore bodies.

For a fuller description of the Geology see report by Hale F. Peterson.[1]

## ORE DEPOSIT

The deposit consists of a narrow steeply dipping vein, both walls of which are granite. The vein outcrop is traceable at intervals for a few hundred feet. Within the mineralized portions of the vein are scattered lenses or pods, containing oxide

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1/ The above Geology was written by Hale F. Peterson, Geologist, Geological Survey.

iron and copper minerals. The widths of the mineralized lenses varies from zero to 2 feet. Along both the strike and dip, unmineralized gouge and altered granite separates the pods. For this reason less than one-half the vein area is mineralized.

## ORE RESERVES

The deposit contains no measurable ore. By careful mining and sorting a few tons of marketable grade copper ore might be recovered between the back of the westerly drift and the surface. By so doing, at the present price of copper, it is doubtful if it would result in a profit.

Nine samples were taken, seven of which were cut on the 35-foot level and two on the outcrop. The position and assay results are shown in figure 2.

## PRESENT STATUS

The deposit is developed by a small untimbered incline (70°) shaft, following the dip of the vein. The shaft is 39 feet deep. At a depth of 35 feet in the shaft, drifts follow the vein both easterly and westerly, exposing in all, some 43 feet of the vein along the strike. The easterly and westerly drift faces are 18 and 25 feet, respectively, from the shaft (fig. 2).

The shaft was equipped with a small headframe, ore bucket and a Model A Ford engine. The Ford engine has a special head so that two of its cylinders supply power while the other two

furnish compressed air, sufficient, it is said, to run a small jackhammer. Through a novel arrangement attached to this same engine, it also serves as a hoist.

Some work had been done recently in the shaft but the property was inactive at the time of the writer's visit.

## CONCLUSIONS

The field evidence shows the deposit to be small, the mineralization erratic, and the valuable metal contents below an economic grade.

It is concluded the property does not warrant further development.